



Global Advanced Research Journal of Agricultural Science (ISSN: 2315-5094) Vol. 5(12) pp. 432-439, December, 2016 Issue.
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Full Length Research Paper

Factors Affecting Watermelon (*Citrullus Vulgarus*) Production among Farmers of Gada Community, Kazaure Local Government Area, Jigawa State.

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Accepted 27 December, 2016

The study was carried out to examine factors affecting watermelon production among farmers of Gada community, Kazaure Local Government, Jigawa State. Structured questionnaires consisting of closed and open-ended questions were administered to fifty farmers who were involved in watermelon production in the community. Simple randomised sampling (SRS) was employed as sampling technique. The data obtained were analysed using descriptive statistics consisting of frequency distribution and percentages. Results indicate that majority of the farmers are young and they are capable of adopting innovation; more than half of the farmers had attended only secondary school. This indicates that the male youths with low level of formal education dominate the watermelon production in the area. The major constraints to watermelon production in the area consist of insect pests and diseases, lack of credit facilities, absence of co-operative societies, and price fluctuation. Affordable credit facilities, provision of good extension services and provision of agricultural subsidies to farmers were recommended for profitable watermelon production in the study area.

Keywords: Watermelon, farmers, demonstration, production

INTRODUCTION

Watermelon (*Citrullus vulgaris*) is one of the important members of the family cucurbitaceae, widely grown throughout the warm tropics and during the summer in temperate regions. The crop is a native of tropical Africa and has been grown in West Africa for many centuries (Sinnadurai, 1992). Watermelon is a warm season crop, which requires continuous warm temperatures during the entire growing period. The crop prefers a hot, dry climate with mean daily temperatures of 22°C to 30°C. The maximum and minimum temperature for its growth ranges

from about 35°C and 18°C respectively. The crop has an optimum soil temperature range of 20°C to 35°C (FAOSTAT, 2001). Warm dry spells are essential during fruit maturity to increase the sweetness of the fruit. High humidity not only decreases sweetness, but also reduces yield and tends to promote excessive vegetation growth (Sinnadurai, 1992). The length of the total growing period ranges from 80 to 110 days, depending on climate (FAOSTAT, 2001).

The crop prefers a sandy loamy soil with pH of 5.8 to 7.2, while its cultivation in heavy textured soils results in a slower crop development and cracked fruits. The recommended fertiliser rates for higher production are 80

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to 100kg/ha N, 25 to 60kg/ha P and 35 to 80kg/ha K (FAOSTAT, 2001).

Worldwide, the yield of watermelon averages about 25 t/ha, varying from 5 – 60 t/ha, depending on cultivars and cultural practices. Watermelon is relished by many people across the world as a fresh fruit. This is because it is known to be low in calories but highly nutritious and thirst-quenching; it also contains vitamins C and A in form of the disease-fighting beta-carotene. Lycopene and beta-carotene work in conjunction with other plant chemicals not found in vitamin/mineral supplements. Potassium is also available in it which is believed to help in the control of blood pressure and possibly prevent stroke (Adekunle *et al.*, 2005).

Watermelon is mainly produced for local and urban markets, each country having its preferences for size and type. Production for export markets has developed in the Mediterranean region, Mexico, Taiwan, Malaysia and Thailand, with mainly smaller-fruited F₁ hybrid cultivars, including seedless types (Van der Vossen *et al.*, 2004). Watermelon business acts as a means of livelihood whereby the producers and marketers of watermelon for their entire lives and that of their families depend on the watermelon business. It generates high revenue to the government from the market (allafrica.com, 2009). The aim of the study is therefore to examine factors affecting production of watermelon among farmers of Gada community, so as to improve their yield, income and living standard.

MATERIALS AND METHODS

Study Area

Gada is a village in Kazaure Local Government Area, Jigawa State. The area is inhabited mainly by Hausa/Fulani with few other tribes (Igbo and Yoruba), who have settled in the area. Farming is the predominant occupation of the people in the area, in which over 75% of the population are farmers. The Area is located between longitude 12°30' to 12°45' and latitude 8°15' to 8°30' North and East respectively (Olofin, 1987). It has a total land area of about 1,780 km² and population of 161,494 people (2006 Census). The area is endowed with natural features such as streams, rocks, and the soil is typically sandy loam, and the dominant crops grown are groundnut, millet, sesame and watermelon. The mean annual rainfall is about 600 mm with the highest input during the months of July to August. Mean annual temperature is about 25.9°C in the coldest months (December and January) and 31°C in the hottest months of April and May (Olofin, 1987).

Sampling Procedure and Sample Size

The extension agent of the area and the village head had

assisted during the selection of fifty (50) farmers as sample size. Simple randomised sampling (SRS) was employed as sampling technique. This means that the sample size was drawn from farmers who are involved in watermelon production; they were randomly selected by using random numbers. This gave rise to fifty (50) farmers as earlier stated in the sample size.

Data Collection

The primary data such as personal characteristics of the respondents which includes age, educational qualification, family size, experience in watermelon farming, method adopted in watermelon production, factors affecting its production and the constraints limiting the production of watermelon in the area were collected.

Data Analysis

Descriptive analysis which involves frequency distribution, percentages, mean, median, tables and gross margin analysis was used to analyse and interpret the result obtained from the research work.

RESULTS AND DISCUSSION

Socio-Economic Characteristics of Respondents

Age of the Respondents

It was observed that, out of 50 respondents interviewed, 39 respondents (78%) are within the age range of 20 to 40 years. This indicates that majority of the farmers are young and capable of adopting innovations; 10 respondents (20%) are with in the range of 41 to 50 years and only one respondent (2%) was above 51 years of age.

Educational Background of the Respondents

With regards the educational background of the respondents the results revealed that, virtually all the respondents had obtained one form of education or the other. More than half of the farmers interviewed had attended secondary school (62%). While 6 respondents (12%) had attended vocational school, and 4 respondents (8%) had attended tertiary institution, only 1 respondent (2%) had never been to school. it is likely that their level of literacy will make for easy understanding of the innovation brought to them, hence, quick adoption of the recommended agronomic practices of watermelon.

Farm Size (ha) of the Respondents

It was observed that, out of 50 farmers covered in the study, 35 farmers (70%) had less than 1 hectare of farm

Table 1: Age Distribution of the Respondents

Age of Respondents	Frequency	Percentage (%)
i) Less than 20 years	0	0
ii) 20 – 30	15	30
iii) 31 – 40	24	48
iv) 41 – 50	10	20
v) 51 and above	1	2
Total	50	100

Table 2: Educational Background of the Respondents

Educational Background	Frequency	Percentage (%)
i) Never been to school	1	2
ii) Primary education	12	24
iii) Secondary education	19	38
iv) Tertiary education	4	8
v) Qur'an education	8	16
vi) Vocational education	6	12
Total	50	100

Table 3: Farm Size (ha) of the Respondents

Farm Size (ha)	Frequency	Percentage (%)
i) 0 – 0.99	35	70
ii) 1.0 – 1.99	13	26
iii) 2.0 and above	2	4
Total	50	100

Table 4: Farmers' Experience in Watermelon

Experience	Frequency	Percentage (%)
i) 1 – 5 years	30	60
ii) 6 – 10 years	14	28
iii) 11 years and above	6	12
Total	50	100

size, while 26 percent (13 respondents) of them had less than 2 hectares of land. Only 2 farmers (4%) had more than 2 hectares of farmland. This indicates that the majority of farmers are operating on small-scale and that their lands were fragmented (Table 3)

Farming Experience (Years) of the Respondents

This was measured by the number of years spent in watermelon farming. It was observed that, 30 farmers interviewed (60%) have been farming for between 1 to 5 years. Moreover, 28 percent (14 respondents) of them have been in watermelon farming for 6 to 10 years. Only 6

farmers (12%) had spent over 11 years in watermelon production. This indicates, majority of the farmers are new watermelon farmers.

Source of Seed, Fertiliser, Pesticides and Herbicides

About half of the respondents interviewed (48%) purchased their inputs from JASCO (Jigawa Agricultural Supply Company), which is considered important for the study; while 46 percent (23 respondents) of them purchased their inputs from the market, as they claimed it is cheaper, but the quality is not assured. Only 3 respondents (6%) obtained their inputs from friends.

Table 5: Source of Inputs of Respondents

Source	Frequency	Percentage (%)
i) JASCO	24	48
ii) Market	23	46
iii) Through friends	3	6
aiv) Any others (specify)	0	0
Total	50	100

Table 6: Types of Fertiliser Used by the Respondents

Type of Fertiliser	Frequency	Percentage (%)
i) Organic fertiliser	11	22
ii) Inorganic fertiliser	24	48
iii) Organic and Inorganic fertilisers	15	30
Total	50	100

Table 7: Varieties Grown by the Respondents

Variety	Frequency	Percentage (%)
i) Sugar Baby	15	30
ii) Kaolack	23	46
iii) Local	10	20
iv) Sugar Baby and Local	2	40
Total	50	100

Table 8: Distribution of the Respondents According to Method Used in Pre-planting Operations

Method Used	Frequency	Percentage (%)
i) Machine	7	14
ii) Manual	42	84
iii) Both the two above	1	2
Total	50	100

Table 9: Recommended Spacing in Planting Seeds

Spacing	Frequency	Percentage (%)
i) Using the recommended spacing	8	16
ii) Not using the recommended spacing	42	84
Total	50	100

Table 10: Methods Used by the Respondents in Weed Control

Weed Control Method		Frequency	Percentage (%)
i)	Hoeing	43	86
ii)	Herbicides	7	14
Total		50	100

Table 11: Number of Weeding Carried Out

Weeding		Frequency	Percentage (%)
i)	Two times	14	28
ii)	Three times	28	56
iii)	Four times	8	16
Total		50	100

Table 12: Spraying the Crop with Pesticides

Spray Insecticide		Frequency	Percentage (%)
i)	Yes	46	92
ii)	No	4	8
Total		50	100

Table 13: Ways of Selling Produce by Respondents

Selling Method		Frequency	Percentage (%)
i)	Direct to consumers	5	10
ii)	Market middlemen	45	90
Total		50	100

Table 14: Perception of Profit by the Respondents

Profitable		Frequency	Percentage (%)
i)	Yes	47	94
ii)	No	3	6
Total		50	100

Table 15: Influential Factors to Grow Watermelon

Influential Factor		Frequency	Percentage (%)
i)	Motivation from extension agent	7	10.9
ii)	Market value	19	29.7
iii)	Income generation	27	42.2
iv)	Adaptability of the crop in the area	6	9.4
v)	Consumers taste and preference	5	7.8
Total		64*	100

* Because of multiple responses of the respondents, the frequency exceeded 50 (fifty)

Table 16: Constraints to Watermelon Production and Ranking

Constraint	Frequency	Percentage	Ranking
i) Insect pests	34	17.2	1
ii) Fruits cracking	31	15.6	2
iii) Fruits rotting	30	15.1	3
iv) Stealing	26	13.1	4
v) Diseases	25	12.6	5
vi) Lack of credit facilities	19	9.6	6
vii) High cost of inputs	12	6.1	7
viii) Marketing problem	11	5.6	8
ix) Poor extension services	10	5.1	9
Total	198*	100	

* Because of multiple responses of the respondents, the frequency extended 50, which is the number of farmers interviewed.

Agronomic Practices Adopted By the Water melon farmers in the Area

Types of Fertiliser Used

The study assessed the types of fertiliser used by the farmers during the production period. Forty-eight (48) percent of the farmers interviewed, are using inorganic fertiliser to supplement the nutrient requirement of the crop. Moreover, 11 respondents (22%) are using organic fertiliser. Also, 15 respondents (30%) are using both organic and inorganic fertilisers, as they claimed that the combination of the two types of fertilisers gives high yield.

Varieties of Watermelon Grown by the Respondents

The study identified the types of watermelon grown by the farmers in the area. About half of the farmers interviewed, which is 46 percent (23 respondents) are growing Kaolack variety, while 15 respondents are growing Sugar Baby. Only 10 respondents (20%) are using local variety.

Pre-Planting Operations

The study shows that 84% of the farmers carried out pre-planting operations manually; while 7 respondents (14%) used machine and also, one (1) respondent (2%) used both machine and manual means. The farmers complained that due to the cost of machine operations and small sizes of their farms, they could not use machine to carry out pre-planting operations.

Spacing in Planting Seeds

It was observed that 84 percent (43 respondents) of the farmers out of 50 respondents interviewed do not follow the

recommended spacing between intra- and inter-rows in planting seeds. Only 8 respondents (16%) are using recommended spacing in planting.

Weed Control Used by the Respondents

Forty-three (43) respondents (86%) are using manual hoeing to control weeds, before the vines of the plants spread on the ground as they have reported. While only 7 farmers (14%) are using herbicides to control weeds, which is not an economical method of weed control.

Frequency of Weeding Carried Out by the Respondents

It has been observed that more than half of the respondents interviewed i.e. 56 percent (28 farmers) of them, carried out three (3) weeding during the production period, while 14 respondents (28%) carried out two (2) weeding, and only 8 farmers (16%) carried out four (4) weeding during production.

Application of Pesticides

A total of 46 respondents (92%) out of the 50 farmers interviewed used pesticides to control insect pest destruction. But the problem is how to make the ratio of chemical and water (mixture) and the types of chemicals to be used. This is very important as it has been reported that watermelon is an insect-loving plant. However, only 4 respondents (8%) do not use insecticides to control insect pest attack.

Marketing

Ways Used by the Respondents in Selling their Produce

The study has observed that 90 percent of the respondents (45 farmers) sell their produce through market middlemen, but they complained that the middlemen were buying the products at low prices; while only 5 respondents (10%) sell their produce directly to consumers.

Profitability of Watermelon Production

It has been observed that 47 respondents (94%) out of 50 farmers interviewed claimed that watermelon production is a profitable business, because it is purchased right from the farm area before being taken to the market, unlike other cash crops which need to be processed before consumption. However, 3 respondents (6%) reported no profit, because of pests and disease outbreaks in their farms.

Factors that Influenced Watermelon Farming in the Area

The study revealed that, among the factors that influenced the respondents to grow watermelon in the area, income generation is the most important factor, because 42.2 percent of the farmers (27 respondents) are influenced by it; which is more than half of the total farmers interviewed. This was followed by market value with 29.7 percent of the respondents, then motivation from extension an agent who has 7 respondents (10.9%), adaptability of the crop in the area with 6 respondents (9.4%) and lastly, consumers' taste and preference with 7.8 of the respondents.

CONSTRAINTS TO WATERMELON PRODUCTION IN THE STUDY AREA

The study revealed that, the constraints faced by the farmers in the area were ranked according to severity of the constraint. Insect pests attack ranked highest among the problems, since 68 percent (34 farmers) of the respondents identified it as a problem affecting their crops. This was followed by fruits-cracking which has 31 respondents (15.6%), fruits rotting was ranked third with 30 respondents (15.1%), while stealing was considered a problem by as much as 13.1 percent (26 respondents) of the farmers making it their fourth factor in order of ranking.

Diseases, lack of credit facilities, high cost of inputs and marketing problems ranked 5th, 6th, 7th and 8th with 12.6%, 9.6%, 6.1% and 5.6% of the respondents respectively. Ten (10) respondents (5.1%) indicated poor extension services as a problem which ranked 9th.

Suggestions by the Farmers on how to Improve Watermelon Production in the Area

It has been ascertained that more than half of the respondents interviewed which is 58 percent (29 farmers) have suggested that government should provide them with loan facilities that would enable them to purchase farm inputs. Nine (9) respondents (18%) have called on the government to provide farming inputs at subsidised prices, and also 10 percent (5 respondents) of the farmers have called on the government to provide good extension services in their area in order to boost agricultural activities. Conclusively, 7 respondents did not say anything to improve the production of watermelon in the area.

SUMMARY

The study was conducted to assess factors affecting watermelon production in Gada community, Kazaure Local Government, Jigawa State. Simple randomised sampling (SRS) was employed as sampling technique and fifty farmers were randomly selected as sample size by using random numbers. Data collection was made using structured questionnaires consisting of both closed and open-ended questions administered to fifty watermelon farmers in the area. The data collected were analysed using descriptive statistics such as percentages, frequency distribution and Gross Margin Analysis.

The results indicated that majority of the farmers in the study area were within the age range of 20 – 40 years. This shows that, the farmers are young and they are capable of adopting innovation. More than half of the farmers interviewed had attended only secondary school and 16% attended Qur'anic education, while 12% had attended vocational school were only 8% of the respondents had attended tertiary institution. However, the constraints associated with watermelon production in the study area include pests and diseases attack, lack of credit facilities, high cost of inputs, marketing problems and poor extension services.

CONCLUSION

It has been observed from the study that, watermelon farming is a profitable enterprise, despite some constraints pointed out by the farmers especially the problem of insect pests. It is believed that, if farmers will be help to overcome these problems, their income from watermelon production will be increased and this will translate to better living conditions.

RECOMMENDATIONS

- i. Government should provide the farmers with loan facilities that would enable them to purchase farm inputs.
- ii. Both Government and non-governmental organisations (NGOs) should encourage farmers to form cooperative societies, which will enable them to access loan facilities and provide them with agricultural inputs at subsidised prices. This will boost their production from subsistence to commercial level and hence change their standard of living.
- iii. The Government (Local Government) should form Agricultural marketing board especially at the local level to avoid price exploitation.

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